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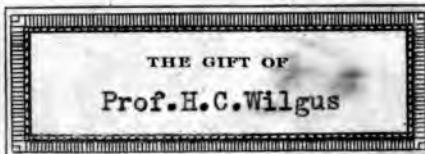
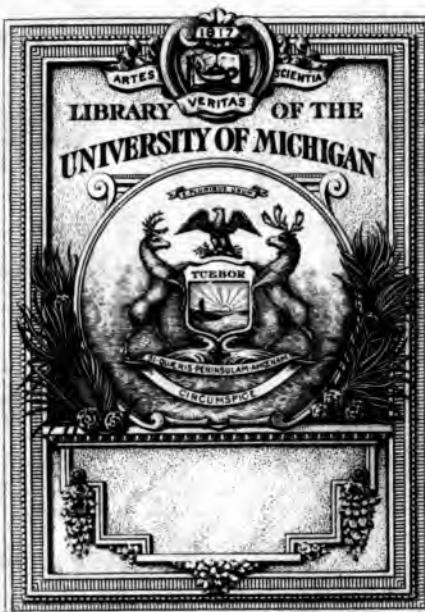
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ECONOMIC TRACTS. No. 1.

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*Law Day 3.*

## THE ELEMENTS

OF

# NATIONAL PROSPERITY;

AN ADDRESS BY

EDWARD ATKINSON

AT 9 A.M.

Opening of the Second Annual Fair of the New England  
Manufacturers' and Mechanics' Institute,

IN BOSTON,

WEDNESDAY, SEPTEMBER 6, 1882.

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DISTRIBUTED BY THE SOCIETY FOR POLITICAL EDUCATION TO ITS MEMBERS, WITH ENDORSEMENT AND RECOMMENDATION.

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*S. A. W.*  
Professor H. C. Wilgus  
11-23-1935

## ADDRESS.

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MR. PRESIDENT, GENTLEMEN OF THE NEW ENGLAND MANUFACTURERS' AND MECHANICS' INSTITUTE, LADIES AND GENTLEMEN,—I have been asked to open this Fair with an address which shall indicate the purposes and methods of its work, as they are defined in the minds of those who founded this Association: I will come directly to the subject without taking up your time with any further introduction. I shall speak without much regard to the danger of being dry or abstruse, but will endeavor, as far as in me lies, to present thoughts which will be, at least in some degree, commensurate with the importance of the occasion. I shall not hesitate to reiterate some statements to which I have previously called attention, but which can hardly be too often presented. I shall spare you statistics as much as possible: they will be found in the notes if this address is published.

The purpose of this Fair is instruction in the application of science to the useful arts. In what manner and to what extent this purpose may yet be developed, depends upon the way in which it is sustained by exhibitors and by the public. Its method is to bring annually into public notice all the recent improvements in machinery, tools, and appliances, to which the inventors, promoters, or owners desire to call attention, with a view to their general introduction. Its medal is a dollar, earned in recompense for a service rendered. It is based upon the simple and fundamental yet little-understood principle, that, in all true commerce, men serve each other.

It also gives to sections, to states, to railway corporations, and to individuals, the opportunity to bring here, and spread

before the eye, examples of the undeveloped resources in which they are severally interested; to exhibit the potentiality of the future; and to show the way to the place where men may supply their wants, and attain welfare.

To this end, especial attention has this year been given to the great middle section of our Southern land,—the land of high and beautiful mountains, the highest east of the Mississippi; heavily timbered to their very tops; divided into ranges by upland valleys of unequalled beauty, salubrity, and fertility; underlain by “all the minerals which animate the arts;” and surrounded by broad upland plateaus where every crop of the temperate and semi-tropical zones finds its true soil and climate.

To this grand tangible prophecy of future national welfare I call your attention; and I may repeat to you what I have said to the people of the South, in the hall of their great Exposition at Atlanta, knowing that you will respond as heartily as they responded. With them let us all be thankful that the principle of liberty established by our common ancestors—by Washington and Adams, by Patrick Henry and John Hancock, by Laurens and Hamilton—could not be subdued, but has dominated both them and ourselves. Let us thank God (that the Potomac has not become the Rhine dividing two hostile nations) and rendering the oppression of great standing armies necessary for each; but that this “Union stands, now and forever, one and inseparable,” bound by the iron bands over which peaceful commerce finds its unobstructed way, and by the common interests of mutual service which only freemen can render to each other.

We welcome our Southern brethren to this Fair, and invite their co-operation in carrying out its purpose and in sustaining its methods. No broader, more national, or more beneficent purpose could be presented; and it being a most righteous purpose its methods will develop themselves as time goes on. It cannot fail. Why is it necessary? The answer is plain. Prosperity consists mainly in ample production, sustained by quick and ready distribution; not much in what is commonly known as accumulated wealth. It is given to very few mem-

bers, even of this community, and to a yet smaller portion of the human race, to possess wealth and leisure under such conditions that they may devote themselves to science, art, or knowledge, for their own sakes only and without regard to their application to industry.

It is a matter of necessity, and always will be, that by far the larger part of the community—at least nine out of ten, probably more—shall earn their daily bread by their daily work. The true end to be sought, therefore, is to make that daily work less arduous.

It is not of much consequence that dollars shall be more plenty if each dollar will buy more in this year than it did in the last.

I shall presently prove to you that the measure of comfort which each man, woman, and child can yet enjoy on the average, even in this prosperous land, must come within what half a dollar a day—possibly, not even probably, sixty cents—will buy at present prices.

The computations of the value of annual product will be given farther on. Different economists have varied in this computation in such measure, that their estimates, applied to our present population, would range from seventy-five hundred to ten thousand million dollars. I have adopted the latter, which gives half a dollar a day to each man, woman, and child.

We now number about fifty-four million, or we shall reach that number very soon. The following table will show how rapidly an addition of products to the value of five cents a day, *per capita*, increases the gross annual product:—

At 35 cents per day our annual product is . . . . .	\$6,898,500,000
40 " " " " "	7,884,000,000
45 " " " " "	8,869,500,000
50 " " " " "	9,855,000,000
55 " " " " "	10,840,500,000
60 " " " " "	11,826,000,000
65 " " " " "	12,811,500,000
70 " " " " "	13,797,000,000

Even the whole waste and cost of war must come from each year's product during the war itself, except such munitions as may be borrowed from other countries. Debt incurred for war merely defers payment.

The first question of wages is a question of quantity,—how much is there produced?

The second question is the question of price, — what is the product worth?

The third question, the question of distribution, — what share of the product at its price does the workman receive?

The wages fund is not the quantity of things previously produced, but it is substantially the quantity produced at the time or in the year in which the work is done.

Fifty cents a day is very surely the average measure of the subsistence, savings, and taxes of each person. One dollar a day for each adult, two dollars a day for each family group of two adults and two children, is the limit, because there is probably no more to buy. By so much as some of you enjoy more, others must have less, if such is the measure of all there is annually produced. What have each one of you done, what are you doing now, to entitle you to more than what half a dollar a day will pay for in food and fuel, shelter and clothing? Are you rendering service equivalent to your greater gain? Are you engaged in useful work by which the abundance of things is increased, and the general struggle for life made easier?

That is the purpose of those who have founded this Association. The glowing visions of quick and beneficent results, which moved our friend Mr. Mudge, — whose presence we miss and whose absence we mourn so much to-day, — may perhaps only be an incentive to us to try to realize them; but what can be done by the zeal and practical energy of your present president and his associates, we may be sure will be accomplished.

This measure of subsistence is indeed very limited: but only those can be permanently helped to enlarge it who can help themselves; and few have done more to establish the practical arts upon a scientific basis by which abundance may be increased, than the men who remain in charge of this work, and who control and direct the work of this Association.

The small minority of the people who can become the possessors of capital in any large measure, even in this great and prosperous nation, must justify the leisure which they or their fathers have earned, by the use which they make of the time and means at their disposal.

The great benefit which ensues in the application of modern inventions to useful productions consists not in the accumulation of wealth, but in the general relief brought about by these inventions in the daily work of life. A larger product, and therefore more ample consumption, are assured from less labor, measured either by hours or by effort; dangerous and noxious conditions of work are abated or alleviated; and it can be clearly foreseen that the time is not far distant—if it is not now present—when even a moderate degree of intelligence and of effort will assure a reasonably good subsistence to every man and woman in the community, who is not disqualified from work by laziness, vice, or inherent disease. These new inventions and appliances also increase wealth; but, so far from its being proved that such an increase is of necessity complemented by increase of poverty, in this country at least the very reverse is true. If my observations possess any value, they prove to me that material prosperity, measured in terms of wealth or income, is like a pyramid constantly rising as if lifted from above, as well as sustained from beneath; and as the apex of the great fortunes steadily rises, while such fortunes are relatively few in number, they do not burden those who are below; but they lift the base higher and higher, and make room for increasing numbers who, except for this lifting power of capital, could have found no place, and might have starved; while, on the other hand, those who come in at the base, which grows broader and broader with each year, sustain the fortunes of those who are above, without being oppressed by them. The prosperity of each and all rests upon the basis of certain definite rules for the possession of individual property both in land and things,—property in possession, and property in use.

Yet these very rules which have taken the form of statute-laws, and which have been gradually evolved in the experience of men, may themselves be abused, and may become instruments which for a time retard progress rather than promote it. This may be especially true in respect to the possession of land.

At the foundation of all property, and underlying all considerations affecting the title to things made by human labor, lies the question of the title to land. Every thing which can be

applied to human subsistence must come either from the field, the forest, the sea, or the mine. To the multitudinous seas, no individual claims title; but to the land, many claim it. From whom is their title derived? There are no direct grants from the Almighty; but it has been proved in the course of human experience that land itself is but a tool, the most productive use of which depends upon individual possession. Where mere possession is abused rather than used, and any large portion of the product is diverted from the subsistence of those who do the work,—in the form of rent to absentee owners, as in Ireland; or in the form of taxes for the support of great standing armies, as in Germany and France,—revolutionary changes, either under the forms of law or in spite of law, may become necessary.

Witness the acts of legislation lately passed by the Parliament of Great Britain, which are in part acts of bankruptcy for the discharge of debts incurred for rent, and in part a recovery by the nation of the control of titles to land, which have been abused.

How soon may similar acts become necessary in England and Scotland, no man can tell. Perhaps our present great harvest in the United States, meeting a fair harvest in Europe, may so reduce the price of food as to make even the present reduced payments of rent on English land impossible; and then must inevitably come a profound change in the whole system of English land-tenure, and a yet greater change in the forms of English society, under which seven thousand people now claim title to four-fifths of her whole soil. Appalling as these questions are, they are simple compared to those which must be solved upon the Continent. The standing armies of Europe are as impossible to be sustained many years longer, as they are to be disbanded, without bringing society almost to a state of anarchy; yet they must be disbanded in the face of our competition for the commerce of the world, when we become conscious of our own strength, and claim our full share in the peaceful conquest of nations.

Witness the great migration, partly forced and partly voluntary, from these overburthened lands. To this country,—in

which the proportion of adults in the total population is already greater than in many other nations,—have come nearly a million and a half of immigrants, mostly in the prime of life, in the last two fiscal years ; and in the present year a million more may come. We are engaged in a work by which the antagonisms of race and language of the Old World will be overcome. Democracy is the solvent, and the common school is the crystallizing medium. Presently the people of this land will have ingrafted upon the narrow but versatile intellect of the Yankee, the courage and endurance of the Englishman, without his pig-headedness ; the cleanliness of the Dutchman, without his stolidity ; the thrift of the French peasant, without his superstition ; the artistic sense of the Italian, without his treachery ; the wit of the Irishman, without his incapacity to trust his neighbor ; the philosophy of the German, without his scepticism ; the acquisitiveness of the Jew, without his selfishness ; the manual dexterity of the Chinaman, without his idolatry ; and the fun and music of the Negro, without his shiftlessness.

Will not such a polyglot race make something of this land more than we can yet conceive ? What will its moral and material influence be a century hence ?

But what—some one may ask—is the application of this statement to our present purpose ? What have we to do with the Irish question ? Where is the connection with this Fair ? It is partly this,—that the Irish peasants who are being forced to migrate will, many of them, come here ; with them are coming Italians and Germans, also forced to migrate by similar causes : and unless we provide in the right way for the instruction of the children of these adults, who are now, and have long been, almost paupers, we shall have the Irish question forced upon us, only in a new form ; and that form will be, how to deal with a mass of people, who, without fault of their own, have become incapable of availing themselves of the advantages of the modern applications of science, and for whose merely manual labor or brute force there may be less and less demand as time goes on. Long years, ay, centuries of submission to the privilege of class and caste, to bad systems of land-tenure, to the intolerance of a priesthood jealous of intelligence, and to

prejudice against wealth, have prepared many of these newcomers to become the dangerous element in our body politic,—the tools of the demagogue and the instruments of the knave; and, unless we can reform and regenerate their children, our children may be called upon to face economic questions which nothing but force can settle.

It takes two to make a bargain—that is, to make an exchange; and it often happens that the very things which every one needs can be produced in greatest abundance, but there is no possibility for many to share the abundance, because they have not been so trained as to be able to render a service in exchange; they are only *common* laborers; and at that time, and in that place, common labor is not wanted.

The material welfare of a people depends, as I have said, not upon one, but upon two factors, which are each the necessary complement of the other:—

1st, An abundant production.

2d, A quick and equitable distribution.

Bad institutions; the unwarranted interference of statutes with individual rights; the abuse of the power of taxation; the waste of public money; the creation of a class of public spend-thrifts who batten upon the labor of a people under the forms of law; ignorance among great masses, and incapacity to adopt the new industrial methods which every day assume new forms,—may, even in this country, as in all others, interfere with equitable distribution, and promote scarcity.

Witness the burden of the standing armies and of the privileges of the few in other countries, to which I shall presently call your attention more directly. True, we are free from these special evils; but let us ask ourselves, how long can we bear without moral, mental, and material degradation, the corruption of the civil service, the spoils system in politics, and the abuses of the power of taxation in cities, states, and nation, which are not only a consequence, but a most potent cause of civil-service corruption?

But let me return from this digression. The subsistence of each year consists mainly in the distribution of the products of the soil, the forest, and the mine, of that special year: perhaps }

a small part of the product of one, or, at most, of the two previous seasons, are consumed this year; while a small part of this year's product is saved for the next.

In respect to food, the world as a whole is always within one year of partial starvation. If work ceased, the most prosperous country would be reduced to general starvation in two, or at the utmost three years. X

In respect to clothing, and the materials for clothing, the world is always within two or three years of becoming naked. }

In respect to shelter, if work should cease, and repairs were not done, the world would be houseless and homeless almost in a single decade. }

In respect to the common ways, our roads would soon become impassable, if not maintained year by year; our railways would be dangerous and presently useless, if the trackmen did not keep up their daily inspection and repair.

In respect even to the great works and factories, it has come to be the conclusion after long observation, even of the most sagacious, that it is almost useless to plan any thing except foundations for a life of more than twenty-five years; and within that term, in almost every department of manufacturing and mechanical work, all the machinery will have been once or twice wholly changed. Hence it follows that each year's life is substantially sustained by each year's work; and this work can never cease, because it is almost wholly spent in sustaining existence: but little can be saved.

It is impossible to prove what portion of each year's product constitutes its cost. I think, from my own observation, fully ninety per cent.

Within the limits of this address, I cannot give the data on which this conclusion is based; but I think it will be apparent that at least nine-tenths of the value or substance of our annual product, whatever its amount may be, must be shared among those who constitute the working force, if the following unquestioned facts are considered.

The capital invested in all the departments of manufacture of Massachusetts does not exceed in amount one-half the value of the gross product of manufactured goods: five per cent profit on the goods will therefore yield ten per cent per annum on the capital. At this rate all the capital will be supplied and invested which the demand for the goods will warrant.

It therefore follows, that, wherever an opportunity can be found to pay ninety-five parts in a hundred to workmen and for materials, that opportunity will be taken.

The same analysis may be applied to the raw materials used in the factories; and the same rule will serve, except that, as a rule, the proportion of capital necessary for the production of raw material is less than is needed in the factory: therefore a larger share of the annual product of raw material must be assigned to labor.

In respect to distribution, it may be considered that the range of commissions and of profits in large establishments is from one to five per cent; and from this small commission all the subsistence of those who do the work is paid.

No great merchant of modern times can save for himself one per cent, or one dollar in a hundred, of the value of the goods in which he deals. I therefore think it can be proved that nine parts in every ten of each year's product are divided among those who do the daily work for their daily bread, and that ten parts in a hundred are the utmost that can ever be set aside for the maintenance or increase of capital or of wealth.

Nine-tenths at least of our annual product are therefore spent in its production or in its distribution, and therefore constitute the cost of each year's subsistence.

This estimate is very surely a safe one. If the annual product is greater than I have computed it, then even a larger proportion is consumed, and a lesser percentage is saved.

It would be interesting and instructive if census data could be compiled which would give accurately the measure of our annual product in terms of money, and also determine the portion spent for mere subsistence; but it is practically impossible. The difficulties are, first, the home or family consumption of the agricultural population, which never finds a place in our market-reports. Even the ascertained market value of our dairy product is as great or greater than that of the commercial cotton-crop; but who can measure the value of the milk consumed on the farm? Again, cotton, wool, leather, iron, and the like, are listed in the census under their own titles, but are duplicated as a part of the value of the manufactured goods.

There is, however, one way of making an approximation to the value of our annual product and its expenditure, and an estimate of our annual savings. We now number about fifty-

four million, over one-fourth of whom are adult males of voting age; and it may therefore be assumed that another fourth are adult women. If we assume that the actual subsistence, repairs of dwellings, public expenses, and other annual items of cost, including all the home productions consumed on the farms, would have a value, if all were priced at the market standard, of one hundred and fifty dollars a year *per capita*, or forty-one cents a day, then our annual product which is consumed must be priced at eighty-one hundred million dollars. This would be six hundred dollars a year for each family group of four, aside from savings.

I do not think it possible to assume less than forty-one cents a day as the cost of subsistence, cost of repairs of dwellings, and proportion of national, state, and municipal taxes, for each member of the nation, men, women, and children included, and also including domestic farm consumption.

If this sum measures in money the actual cost, that is to say, the consumption necessary for each year's work, and if this is ninety per cent of each year's product, then we have a product of the value of nine thousand million dollars, and an annual surplus, used either to maintain or added in part to the wealth and in part to the capital of the country, of nine hundred million dollars.

If the average daily measure of the annual product consumed by each person be a little more, or forty-five cents a day, constituting nine-tenths of that day's product, then the total measure of production is fifty cents for each man, woman, and child. This would give ninety cents a day for the value to themselves of the work of the adult men and women who compose one-half the population, and ten cents over for the maintenance and increase of capital, counting three hundred and sixty-five days to the year. At this rate the annual product of each adult man and woman is measured at one dollar a day, or at three hundred and sixty-five dollars a year; of which \$328.50 is expended for the subsistence, shelter, and taxes of one adult and one child; and \$36.50 is set aside for the maintenance and increase of capital. At these rates, our total annual product, if measured in money, would be \$9,855,000,000, or in round fig-

ures \$10,000,000,000 worth a year; and the portion set aside for the maintenance and increase of capital, ten per cent, or in round figures \$1,000,000,000. A large part of this latter measure, more than one-half, must be applied to the maintenance of existing capital; the rest is added to the wealth or to the capital of the country.

In point of fact, the census data, as far as we have them, tend to prove these figures to be substantially correct, especially of the measure of the annual product to be assigned to each one of the working force; the real working force being less than one-half of the population, and the average product somewhat over the measure of one dollar a day for the year through, including Sundays, so far as the data are yet published.

It may seem almost appalling to those who are not accustomed to submit to such a narrow measure of comfort, to be assured that the total annual subsistence, shelter, and taxes of each man, woman, and child, together with the entire margin for the profit or saving, must come within the measure of what half a dollar a day will buy; yet this must be so, because that is probably the measure in money, at market prices, of all that is produced. We cannot have more than there is, and this is very surely all there is. Even if it be seventy cents a day, would it not then be true that one-tenth part of the people of the world little know how the other nine-tenths live?

The family unit of this country consists practically of four persons, there being one adult male of voting age in each four. At fifty cents *per capita*, as the measure of the total production (including domestic farm consumption), the gross value of each day's average product would be two dollars; equal to seven hundred and thirty dollars per year for each family. Ten per cent off, for the maintenance and increase of wealth and capital, leaves six hundred and fifty-seven dollars per year net; which would be, under these conditions, the average measure of consumption of each group of four persons, including all taxes, at the retail prices of commodities—that is to say, at the prices which measure the final distribution of all products.

National, state, and municipal taxes divert about seven per cent) of the computed annual product from the pockets of the producers to those who perform the necessary functions of government: this deduction for taxes leaves a little over six hundred dollars a year net to each family of four persons.

This is a large estimate for an average family of four, rather than a small one; and I have erred, if at all, on the liberal side of the estimate; my point being to prove that the average subsistence of each man, woman, and child in this prosperous country, must be limited to the measure of what forty to fifty cents a day will buy.

We must add one thousand million dollars' worth to the product of each year, in order to be able to add only five cents' worth per day to the consumption of each person; so close do the footsteps of want press upon the limits of welfare.

Who dares scout the science which, under the name of "*political economy*," treats these vast questions of human welfare, in which a single error or misapplication of the functions of government may cost the very lives of armies of men a century hence?

The abuses of centuries are culminating in Ireland to-day; and the compromise with slavery, to which our ancestors consented, cost the lives of more than half a million men, and imposed upon us the burden of our present debt, and our complicated and onerous system of taxation. Slavery was only a form of the organization of labor, a false method of inducing production.

What, then, can we do to make the struggle for life easier? The only answer is: Give such instruction as will develop brain and hand together, so that the purchasing power of each dollar may be increased. Save the waste of labor and the waste of product. We are the most wasteful nation in the world; and one reason is, that, even at our present measure of product, there is vastly greater abundance here than there is anywhere else.

What margin is there for increase, or for saving, do you ask? The answer is plain. Our general methods of agriculture are poor and shiftless; our crops are not one-half what a reasonably good system would bring forth. The potentiality of a single acre of land is still almost an unknown quantity. If I were to say to you, that, next to the abolition of slavery, and the use of the railway and the steamship, the re-discovery of the method of saving green crops — called *ensilage* — was the most important event in its effects on material welfare of the present century, you might suggest that a commission of lunacy should be appointed to examine the condition of my brain. Consider the waste of fencing, because one man cannot trust his neighbor to keep his cattle where they belong. Witness the waste

of sheep, because the cur dog is tolerated while the farmer suffers.

Marvellous as the machinery in this great building may be, science has work to do vastly greater than any thing yet accomplished. Almost the only tools yet perfected are the water-wheel and the dynamo-electric machine. Look at that seemingly perfect steam-engine and boiler: it wastes nine-tenths of the fuel with which it is supplied. Examine that costly and clumsy locomotive and heavy train of cars: only one pound in a hundred of the fuel used is actually applied to the movement of the load. Observe that almost self-operating carding-engine, spinning-frame, and loom: are they perfect? Four-fifths of the power is wasted in operating them; and, when you have put your cotton fibre into cloth, you have lost three-fourths of its original strength by your rough treatment.

Your builders cut up your timber so as to lose or waste one-half its strength; most of your architects plan your buildings so as to assure the most perfect combustion. You make a clumsy effort to distribute your fire-loss of nearly a hundred millions a year through insurance companies, and you waste forty per cent of your premiums in the mere expense of making the attempt. You cannot even start a horse-car without wasting the knees of your horses by the excessive strain.

I might go on in this line indefinitely, but the greatest waste of all is the waste of food and fuel.

The grain, root, and hay crops of this country weigh over one hundred and fifty million tons,—three hundred thousand million food pounds to be harvested, sorted, distributed, converted into meat, butter, cheese, bread, and the like, in order that each one of us may have our daily ration of about three pounds,—a pound each for our breakfast, dinner, and supper.

Seventy million tons of coal are mined and converted. Are we not all aware that half our food is wasted, and perhaps more than half our fuel, especially in cooking?

How shall we save this waste? Must we not save it if each man, woman, and child can earn, on the average, only what fifty cents a day will buy? Try for yourselves what you can get in the little shops on the South Cove, or at the North End,

where the poor must buy their food ; and then you will know why so many suffer want, even in the midst of plenty, for the lack of instruction in the commonest arts of life. Must not our common schools be somewhat common in quality, when they qualify their pupils so little in the practical arts of life ?

And here let me call your attention to the importance of the smallest fraction saved. In order to do this, I must repeat myself. The average charge upon the New York Central and Hudson River Railroad, in 1866-69 inclusive, was 1.9567 cents in gold,—say, two cents per ton per mile. From 1870-79 inclusive, it was 1.1123 cents. The difference was only .8444, say eighty-five one-hundredths of a cent per ton per mile. Yet, in the ten years last named, this difference saved the consumers of the goods carried over this one line one hundred and twenty-one million gold dollars.

The average charge over this line has been again reduced, and was last year only seventy-eight one-hundredths of a cent per ton per mile.

This line performs one twenty-sixth part, only, of the railway service in moving merchandise of the United States. If all the other railways have reduced their rates since 1869, only one-half as much as this corporation has reduced theirs,—which is far within the fact,—the saving on the moving of merchandise in the year 1881, as compared to the rates prevailing from 1866 to 1869,—only twelve to fifteen years since,—was over \$400,000,000. Let us be conservative, and call it only \$300,000,000; and then we have a sum more than sufficient to pay the first cost of the 9,400 miles of new railroad which we added to our service in that year.

Eighty-five hundredths of a cent a ton a mile is equal to \$8.50 per ton from Chicago to Boston, or less than a dollar on a barrel of flour carried a thousand miles ; yet this little fraction, applied only in part to the total traffic of all the railroads of the United States, worked a saving of over \$200,000,000 a year, for ten years to 1879, inclusive ; and at the yet lower rates of 1880 and 1881, as compared to 1866-69 inclusive, this saving has been, at the very least, \$300,000,000 a year, or 33½ per cent of the estimated amount of our possible annual addition to our wealth or capital.

It has not been added to capital, however: by far the larger part has gone to the benefit of consumers, and has been saved by them in the work of gaining their subsistence. This is the function of capital in the form of a railroad.

This is a complete example of the thesis which I have presented. These great applications of science save a part of the necessary work, and render the struggle for life far easier.

The figures which prove this proposition are so startling that it is necessary to sustain them by citing the actual facts. In the year 1881 the New York Central and Hudson River Railroad moved 11,591,379 actual tons of merchandise, or 2,646,814,098 tons carried one mile; for which service it received \$20,736,750, or seventy-eight hundredths of a cent a ton a mile. The average charge from 1866 to 1869 for the same service (rates reduced to gold) was 1.95 cents per ton per mile (1866 to 1869, inclusive, 10,102,659 tons moved; 1,868,-448,179 tons moved one mile; receipts in currency, \$50,556,876): difference, 1.17 cents per ton per mile saved on 2,646,814,098 tons, equal to \$30,970,000, in the single year 1881.

In the year 1881 the total receipts of the New York Central and Hudson River Railroad for freight constituted  $3\frac{7}{6}$  per cent of the total freight receipts of all the railroads of the country, or a fraction under one twenty-sixth part of the whole.

If the reduction in the freight charge on other roads, or the saving which has been compassed by the construction of new lines, has been equal to that on this line, — 1.17 cents per ton per mile, — the saving would amount to over \$823,000,000 in the single year 1881, upon the traffic of that year.

Mr. H. V. Poor computes the whole traffic of all the railways of the United States, including coal, at not less than three hundred and fifty million tons, or more than thirty times the quantity carried by the New York Central and Hudson River Railroad.

Let me repeat this proposition: if the construction of new lines, and the reduction of charge on old lines, has saved consumers one cent and seventeen-hundredths per ton per mile upon the actual traffic of the year 1881, as compared to the charge made for railway service from 1866-69 inclusive, the difference in the year 1881 amounted to over *eight hundred million dollars*.

The fortunes which the railway magnates have secured to themselves, and which they are now applying in part to an extension of the railway service by at least ten thousand miles in the year 1882, constitute but a small part of this saving: the greater part has been secured by consumers, and has to that extent reduced the cost of subsistence.

Upon this basis the computation of an actual saving to consumers of \$300,000,000, as given in the body of the address, may be considered a very safe and cautious one.

In fact, the effect of the construction and extension of our railway service, and the progress made since the panic of 1873 in the reduction of its cost, almost transcends comprehension; and all computations and forecastings based upon these changes have a visionary aspect even to the most careful student. The gain in this respect more than compensates for the waste of public money and the abuses of the powers of taxation, and thus even retards the progress of economic reform by obscuring the evil effects of excessive taxation.

In this address it is therefore made apparent, on the one hand, that the average measure of comfort which each man, woman, and child can enjoy must come within the substance of what half a dollar a day will buy; while, on the other hand, this analysis of the result of science applied to the construction of railways proves, that, after making due allowance for the fluctuations of the seasons and the variation of the crops, the purchasing power of each half-dollar has been increased at least five per cent, perhaps more, since 1870.

I have computed the present value of the products of the United States, at the place of consumption, at \$10,000,000,000, which gives each inhabitant fifty cents' worth a day.

The freight earnings of the railroads of the United States in the year 1881 were \$51,968,477.

The cost of distribution by rail was, therefore, five and a half per cent upon the computed value of the product.

At the higher rates of 1866-69, this charge for railway service might have been \$1,350,000,000, which would have been 13½ per cent upon the computed value of our whole product. If consumers have gained the sum used in the body of this address, — \$300,000,000, — then the purchasing power of each half-dollar has been increased three per cent since 1870. If \$500,000,000, then five per cent. If \$825,000,000, then over eight per cent. Add to this amount saved by railroads the results of the improvement in machinery applied to agriculture, to manufactures, and to the mechanic arts; and I think it is safe to repeat what I have elsewhere affirmed, that the aggregate labor of the people of the United States has been made at least one-third more effective by the application of science to the useful arts since the end of our civil war in 1865.

In other words, the purchasing power of each person's daily income of half a dollar has been increased one-third in less than twenty years. How soon will it be doubled? It now costs more to live, because people demand more, spend more, and, on the whole, enjoy more, than they used to; and they also waste more. The wages of factory operatives are double what they were in 1842, and the hours of labor are

ten to eleven per day now, as compared to thirteen then. The daughters of New England farmers have found less arduous employment at much higher wages; while the immigrants, who now constitute the great body of the factory operatives, would then have found only the most arduous menial or common labor, could they have then found any place in our body politic.

One of the best definitions of man, as compared to beasts, ever given, is this: "Man is the only animal endowed with progressive desires."

The more there is, the more we spend; the more we have, the more we want. The measure of a sufficient fortune or income is a little more, and thus the world wags on.

And as it is in this matter of the railroad, so is it in all things: the difference between welfare and poverty consists only in knowing how to save a dollar in moving a barrel of flour a thousand miles. It costs to-day only half a dollar to bring a barrel of flour from Chicago to Boston, and a barrel a year is all that each person needs. Now, let me ask you, how much do we lose in not knowing how to make bread,—how to use the barrel of flour? How large a factor in the national welfare is in the mere question of household economy?

How much will this Fair teach us on that subject? Follow the wheat from the field to the poor man's table, and you will soon prove to yourselves that ignorance of the simplest household arts is a heavier tax than the entire cost of railway service. Is this to the credit of our schools? I will not undervalue in the least the mental instruction of the schools; I would not deny the opportunity for the highest instruction: but if a large portion of the time of the pupils is not spread over a great mass of merely mental rubbish, a great injustice is being done by their critics.

In order that these propositions may be made plain, and the purpose of this address may become more clear, let me ask you to discharge from your minds all idea of money and of price. Money is merely an instrument by which the exchange of services among men is rendered easy. Price, whether applied to things or to services, is but a measure expressed in terms of money. What really happens is this: A small, very small, part of the work of each year can be saved in the concrete

form called capital ; that is to say, in the form of a railway, of a factory, of improvements upon land, or developments of a mine ; and when thus saved it is so applied as to increase the production or lessen the work of the next and of ensuing years.

As I have said, I am of opinion, that, even in this prosperous country, not less than nine parts in ten of the total product, on the average, constitute the cost of production, and are consumed in different proportions by those who do the work.

To the workman or workwoman it matters not what the measure in money is by which their wages or earnings are defined. The real question is : How good a house, how large a room, how adequate a supply of food and fuel and clothing, can I purchase with that money ?

It therefore follows that every application of science to manufacturing industry, to mining, or to agriculture, by which the aggregate of things is increased, while the labor is diminished, tends to increase the quantity of the commodities to be divided among the laborers ; and, as this increase is progressive year by year, the proportion which capital can secure to itself under free contract becomes less, while the proportion which is assigned to labor becomes greater.

The object of this Fair is to bring into prominent notice every new application of science by which abundance may be increased ; and also to bring to the knowledge of those who seek a new place in which science may be applied, the sections of country and the natural resources which are yet undeveloped. It is a great object-lesson in human welfare.

But of what use will this great lesson be if boys and girls and men and women are not qualified to take advantage of the opportunities thus spread before them ?

It may happen, that, by the application of intelligence and of science on the part of the few, the quantity of things produced has been greatly increased ; and yet, in the midst of plenty, sometimes thousands, ay, even hundreds of thousands of men and women have suffered want. Witness 1873. Why is this ? Must it always be so ? It may be said, it *ought* not to be ; it *need* not be : and yet it probably *will* be so for many years to come.

It may be that those who have lived in foreign lands until they have come to adult years under obstructive laws or systems; and who have not learned how to do any service by which they may gain a part of this abundance, except in the commonest of common labor, will be very poor, even here in the midst of plenty.

Hence will follow the continued need, not only of charity, which takes the form of giving alms and sustaining life, but of that mental charity also, which, even while repressing the outbreaks and disorders which may arise from the presence of those who are not only very poor but very ignorant, will yet palliate and excuse even the evils which it may be necessary to suppress by force.

But if the grand purpose of those who have founded this association can be carried into action, if methods of industrial instruction can be added to the mental training of the schools, if the hand and the head can be developed together,—as the children of these immigrants grow up, they can be qualified to render such service to their fellow-men that the measure of their earnings or wages shall be ample for their welfare.

It is by such instruction, by such preparation for the need of future generations, that the very causes of want may be almost wholly removed.

Let me illustrate this. Every master-manufacturer, every master-mechanic, every capitalist who desires to employ others, seeks to hire the man or woman who can make the largest product at the lowest cost. And now I beg to present to you a proposition which is very far-reaching, very subtle, and of very wide application, but which is seldom considered unless attention is almost forced to it. It is this: So long as freedom of contract is not restricted or obstructed by statute-law, so long as laws are enacted only for the enforcement of justice and order, the prevention of crime and punishment of fraud, and the accomplishment of purposes which cannot be worked by individuals, it will be found that high wages or earnings are almost the necessary correlative of low cost of production; and not, as is so commonly assumed, that low cost can only be compassed by way of low wages.

This seems a paradox: yet it is elementary, and it is within the observation of every one of you here present; from your own experience you can prove or disprove this proposition. It simply needs to be borne in mind that the annual profits of capital and the annual wages of labor are both derived alike from the annual product. The more effective the capital in the form of machinery, the less the number of persons required, the higher the wages. The more skill on the part of the persons who operate the machinery, still again the less the number required, and the higher the wages. The more effective the capital, the lesser the proportion which the capitalist will secure in order to make good interest upon his investment. The more adequate the skill, the larger proportion will the laborer attain. The more effective the application both of capital and of labor, the larger both the profit and the share of the laborer. And when this product is converted into terms of money, or what money will buy, the higher the price of wages, and the lower the cost of the production.

It therefore follows that the rate of wages or earnings of the masses of the people who are of necessity engaged in their daily work for their daily bread will be high or low (always assuming an honest specie standard for the money in which the sum of wages is to be expressed): —

1st, According to the conditions and resources of the country in which the labor is exerted;

2d, According to the freedom of that country from statutes under which the liberty of the individual is restricted.

3d, According to the freedom of that country from the imposition of taxes by which a large portion of the products of labor are diverted from the remuneration either of labor or capital, and are applied to what may be named (for the purposes of this consideration) destructive taxation.

Of the first two conditions I need not speak at length; but I may call your attention to our paramount advantage in respect to the third.

There are two kinds of work to which the proceeds of taxes are, or may be, applied: —

1st, Constructive work which the municipality, the state, or

the nation can perform better than the individual: such as, the making of common highways, the maintenance of common schools, the postal service, and some other simple functions distinct from the administration of justice or other administrative functions of government.

In this country even the support of the army may be included in the constructive work of government, because it is our good fortune to need an army only to serve as a border police, and for the protection of settlers engaged in increasing the general product.

But if we compare our condition with that of those states of Europe which are called civilized, we find a marked difference. In such states, for various reasons, a very large proportion of the annual product of labor is taken from the people in the form of taxes, and is applied either to sustain special privileges, or merely to the destructive purposes of war.

I may cite to you the comparison between this country and France and Germany considered together. The long-continued error in regard to the true function of commerce, which has dominated the mental conceptions of those who assume to govern those great states,—to wit, “that, in all commerce, what one nation gains another must lose,”—has kept those two states apart more than any prejudice of race or difference of religion; but from all these causes combined,—namely, industrial prejudice, hatred of race, and the perversion of the religious idea,—each of these nations finds it necessary to protect itself against the other and against all the rest, by maintaining standing armies in camp and barracks, which to-day (without consideration of the reserves, but including those who are engaged in merely preparing material for war) number over one million men out of a population of eighty millions.

Our proportion to-day, if we were obliged or chose to maintain a standing army, in ratio to our present population of about fifty-four millions, would be seven hundred thousand men: more than one in twenty of all the adult males of voting age within the limits of the country would be withdrawn from their productive work, whereby the quantity of things to be divided between labor and capital, from each year's annual product, would be so much diminished.

Yet more: one more man in every nineteen of those remaining would be forced to labor in order to pay the taxes necessary to sustain the seven hundred thousand idle men gathered together in camp and barracks waiting for the work of destruction.

Let me prove this. This army would be, in its organization and in the persons who compose it, like unto the great industrial army engaged in our greatest works. The officers of the armies of Germany and of France must be men of ability, equal but not superior to those who lead the industrial armies of this country,—equal in capacity but how inferior in purpose,—to the men who build and control the railroads and the iron-works, manage the factories, bring order and system into action, and direct the productive energy of the people.

The soldiers composing the destructive armies of France and Germany are in the prime of life, capable of exerting the maximum force ever developed by them. They would be like unto those who constitute the working force upon our new railroads and in our mines and factories; and seven hundred thousand, which would be our proportion did we emulate those nations in the work of destruction, would outnumber the whole force of adult males who are to-day engaged in building railroads and in all the iron-mines, iron-works, and all the textile factories of the United States combined.

This minus quantity, this reduction of product, this scarcity which is enforced upon these nations of Europe by their armies, may be measured by the construction of all our new railroads, and by the addition to our annual product of all the product of our iron-mines and iron and steel works and all our textile factories combined, to which the labor of adult men is applied (omitting the product of women and children) in these United States.

And yet more: the cost of these great European armies of destruction, levied in the taxes and paid by those who are permitted to remain in the work of production, is more than equal to the sum of all the wages earned in this country by all the iron-miners, all the iron-workers, and all the men, women, and children in our textile factories, put together.

Must not wages or earnings in this land be higher than in any other land thus burthened? Must not the quantity of things to be divided — which constitute the true earnings — be so much greater, and the cost of making so much less?

If you apply these rules to your own experience, each one of you, you will find how true they are. The last man or woman whom you desire to discharge from the works which you control, when the times are hard, is the one earning the most for himself or for herself; the first to be discharged is the unfortunate one whose hand and brain have not been developed together, and who can, in hard times, no longer render you a service, even if paid a sum barely sufficient to support life. Even if the conditions become such, as they did from 1873 to 1879, that skilled mechanics and artisans find no demand for all their work, then they, by their very training, have been made competent to change the method of their work, and in new places, under new conditions, they assure welfare for themselves.

And as it is with persons, so it is with classes, with states, with countries. Where the conditions are best, where the natural resources are the greatest, if no obstruction is interposed by statute-law,—there will be found the most skilful persons, the best machinery, and the largest product. If, under free conditions, you would seek to find the place in which the very lowest labor cost of any given thing is compassed, you may take as your guide the measure of the highest wages earned by those who do the work.

Where earnings are the greatest,—earnings being but a share of a large product ensuing from favorable conditions, ample capital, and superior skill,—you will most surely find the lowest cost, always provided that in that place justice and equal rights are assured, that the government is honest and stable, and that the taxes are not diverted from public uses to private ends.

This rule will not apply to hand-work or handicraft. The fine silks of Lyons woven only on a hand-loom, the laces of Brussels, the fine carving of Switzerland, the Tuscan jewelry, the production of tea in China, the spade-labor of Belgium, and

the like, can only be conducted on the lowest rates of earnings, barely sufficient to support life; and yet the fabric may be of extremely high cost, because of the amount of labor, or the arduous conditions under which it is conducted.

There are yet many occupations which we cannot afford to carry on in this country so long as we can procure the product in some other way, because the amount of labor is so great, or the necessary conditions are still so bad.

We have a continent yet to subdue, in which we can choose our work.

Glance your eye over this vast collection of the potentiality of our Southern land. Witness the profusion of every thing needed to sustain life in comfort. Observe the coal and iron lying close together upon the very surface of the earth,—not separated, as they are farther north, by great intervening mountains of sandstone, but the coal, iron, and limestone lying one against the other at the head-waters of great navigable rivers, where they can be converted to the use of man with the least expenditure of human labor.

Glance over this great exhibition of timber which has been so wasted, even in our Northern States. Witness the variety of the products of agriculture which can be brought to the service of man amid scenes of utmost beauty; and, so far as a very large section of the Southern country is concerned, under conditions unequalled on this continent for health and salubrity. Why have they not been developed? Because labor was not honored, and he who exerted it could not enjoy the earnings.

Why are they being developed now so rapidly? Because the South to-day is even in advance of the North in the effort which she is making to promote the instruction of the hand and the head together, in order that she may avail herself of her great advantage, and overcome the malignant effects of a century of slavery, and of misgovernment and lack of education of almost every kind.

We welcome her competition. We will emulate her in her progress. Each needs what the other can produce; and in the exchange of service between the States, free and unrestricted

as it is and as it must remain under the beneficent provisions of our Constitution, each section will gain under the working of that law which I presented at the beginning of this address, — that all true commerce among men, whether between states or nations, is but the exchange of service by which both are made more prosperous, and both are rendered more capable of sustaining their own population in comfort and well-being.

It will be apparent, if this principle be admitted, — namely, that where mental capacity and manual dexterity are combined, and are applied under the best conditions to the direction of machinery, there will be found the largest production, the highest wages, and the safest and most adequate remuneration of capital; and also, if it be admitted that the production of the joint work of labor and capital would be most completely enjoyed where there is the greatest freedom from what I have called destructive taxation, it follows that this country has the advantage over all others, —

1st, In the variety and extent of its natural resources, capable of being worked with the least exertion or effort.

2d, In the fact that in some sections of the country, and presently in all, the systems of common education, even if still imperfect, yet on the whole do qualify pupils to apply the greatest versatility and to combine mental and manual capacity at least somewhat more completely than in most other countries.

3d, In our absolute and paramount advantage in being free from destructive taxation.

From all these advantages, it follows that both the wages of labor and the remuneration of capital must be greater in proportion to the effort used than in any other section of the world's surface; and these facts themselves prove that the cost of production — in other words, the labor expended in productive service — is less in ratio to product than it can be anywhere else. Therefore our high wages are but the sign and proof of low cost, and we may command the commerce of the world, if we so elect.

We may exchange the product of a single day's work of machinery, directed by one man, for fifty or one hundred days' product of those who are still obliged to follow pursuits to

which either their ignorance, their backwardness in the use of machinery, or want of opportunity, prevents the application of their labor under favorable conditions.

We may obtain the product of perhaps fifty days' labor in the coffee-plantations of South America or of Java; or one hundred days' labor in the tea-fields or mulberry-groves of China; or twenty days' labor in the sugar-plantations of Cuba, or the hemp-fields of Manila; or ten days' labor in the wool-growing sections of South America and Australia,—for the work of a single man or woman directing machinery operated by steam or water power. By means of such exchange, we can increase the quantity of things to be divided among our own people, while conferring a benefit even upon those with whom we exchange, who without our demand could perhaps make no disposition even of the surplus of their hand-work: thus both parties are vastly benefited, and commerce becomes the measure of intelligence, of civilization, and of wealth.

Many attempts have been made to compute the actual wealth of a state or nation statistically; but such figures can give only approximate estimates at a given time, since progress is much greater by way of the destruction of what has been wealth, than by its accumulation.

The substitution of simple for complex machinery, by means of which greater production is assured, coupled with the application of capital of less money value, is an instance.

In this address I have assumed a thousand million dollars' worth of products set aside for the maintenance and increase of capital, or ten per cent upon an approximately accurate estimate of an annual product of ten thousand million dollars' worth of substance.

If five per cent had been set aside for the maintenance of capital previously accumulated, and five per cent of our annual product had been added each year to the wealth or capital of the country, the effect would have been the same as that of money put at compound interest at five per cent per annum. There is nothing to show for any such accumulation.

Massachusetts possessed in 1875, according to Carroll D. Wright's most admirable and accurate census, confirmed by the tax commissioner's reports, property aside from the value of land amounting to only six hundred dollars per head of the population, which sum measures a saving equal to only two or three years' production of the same State in the same year; and there is probably no state in the world in which the annual product per head is larger, being not less than two hundred, probably about three hundred, dollars per year *per capita*.

